Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

an extensive study of diurnal stomatal changes, the influence of physical factors on the opening and closing of stomata, and the effects of these stomatal movements on transpiration. The main observations were made on alfalfa, potato, sugar beet, onions, and cereals, but some sixty species in all have been examined. He finds three types of stomatal behavior: the cereal type, typified by barley; the thin-leaved mesophyte type, typified by alfalfa; and the fleshy-leaved type (not confined however to plants with fleshy leaves), typified by such plants as the potato, cow beet, and onion; each of these has a different closure reaction to extreme conditions. The cereals show no opening of stomata at night, no matter how slight the opening by day has been. The thin-leaved mesophytes have the stomata usually open by day and closed at night, but under extreme conditions show a closure during the middle of the day, correlated with an opening at night. The thick-leaved plants behave much as marsh plants do, having their stomata open day and night when water content is high and evaporation low, and showing a tendency to close only when the evaporating capacity of the air is high.

Many details regarding the effects of environmental changes, such as light intensity, temperature, evaporation, wind flow, water content of soil, leaf turgor, and habits of growth on stomatal behavior are presented, from which one may draw the general conclusion that stomata are sensitive to environmental conditions, particularly to light, and to factors that reduce the water content of the leaf, and that they open and close as conditions necessitate. The evaporation studies indicate that atmometers and potometers do not measure accurately the total effect of evaporation factors upon plants, a result that is not surprising.

The final section on the effect of stomatal movement upon transpiration throws much light on the mooted question as to whether stomata exert a regulatory function in transpiration. LLOYD had concluded in 1908 that stomata have no regulatory function, a conclusion which was rendered doubtful by several investigators, including ILJIN, who studied the transpiration of mesophytes and xerophytes in ravines and on the Russian steppes, and who found marked evidences of regulation of transpiration. This work by LOFTFIELD seems to settle the question definitely in favor of stomatal regulation, particularly when the apertures are nearly closed. As long as the apertures are more than 50 per cent open, the transpirational water loss is controlled by evaporation factors alone, but with closure almost complete, the stomata regulate very closely the water loss from the plant. The paper is beautifully illustrated with plates showing photomicrographs of stomata.—C. A. SHULL.

Anthocyan pigments.—NOACK[7] has found rhamnose-free flavonol diglucosides to be much more abundant in green leaves than has generally been supposed. In such leaves as he studied he was able to establish the existence of flavonol-anthocyan in couples of similar glucosidal nature, but secured no evidence of aromatic nucleus composition in such cases. He suggests that these couples function as a reduction mechanism during photosynthesis.

---

[7] NOACK, K., Zeitschr. Botanik **14**:1–74. 1922.

WHELDALE[8] had already indicated reasons for believing anthocyan formation associated with photosynthetic defect. NOACK'S work strengthens this view. He finds fluorescent media in the presence of light capable of oxidizing anthocyanins to flavonols, and a general inverse relation between chloroplast integrity and anthocyan content. Especially has he shown that absence of carbon dioxide will cause anthocyanin formation in sunlight, and that engorgement with sugar probably acts indirectly (he thinks by disturbing the photosynthetic mechanism) in producing anthocyanins. That there are serious gaps in his work he has been the first to admit. He has, however, given added dignity to a point of view which comes surprisingly close to harmony with much of our knowledge. The action of narcotics, low temperatures, high insolation, and ultraviolet light, nitrogen and phosphorus starvation, as well as extremes of youth and senescence in photosynthetic organs, certainly fall in line with such a conception in a most disarming way.

The formation of anthocyanins by reduction from flavonols, as well as WILLSTÄTTER'S[9] general scheme for color change, are elucidated by EVEREST and HALL[10] in a trenchant reply to the paper of SHIBATA, SHIBATA, and KASIWAGI.[11] It will be recalled that the latter workers attribute color conditions to metal organic or complex compounds of reduced flavonol glucosides, rather than to alkaline phenolic salts, free stages, and red oxonium salts of anthocyanins. In the present paper strong evidence is adduced that this contention is based upon work with supposedly pure substances which were actually mixtures, and the resultant analyses are pronounced of no value. It is interesting to note that EVEREST and HALL now believe blue flower pigments to be of two general types, the alkali phenolic salt of anthocyan, which polymerizes to colorless on standing, and the iron double salt, stable in dilute solution. They have also demonstrated the existence of flavone substances in a number of very young buds previous to anthocyan formation, but have failed to find anthocyans preceding flavone formation in flavone-holding organs.

There can be little doubt that botanists are now ready to look with the keenest interest toward precise chemical comparisons of flavone and anthocyan pigments wherever the two are found associated, whether simultaneously or in sequence.—PAUL B. SEARS.

---

[8] WHELDALE, M., The anthocyan pigments of plants. 1916 (p. 81).

[9] WILLSTÄTTER, R., and EVEREST, A. E., Liebig's Ann. Chem. **401**:189–232. 1913.

[10] EVEREST, A. E., and HALL, A. J., Proc. Roy Soc. B **92**:150–162. 1921.

[11] SHIBATA, SHIBATA, and KASIWAGI, Jour. Amer. Chem. Soc. **41**:208. 1919.